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EXAMINER

DONG, DALEI

ART UNIT PAPER NUMBER

2879

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/728,671

Applicant(s)

MORRIS, THOMAS M.

Examiner

Dalei Dong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6, 12, 13, 15-17, 25 and 30-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 12, 13, 15-17, 25 and 30-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 3, 2006 has been entered.

### *Drawings*

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the flat base being in physical contact with the substrate must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency.

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Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 2-5, 12, 13, 17, 25 and 30-37 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the light emitting elements being in physical contact with the thermal conduct, does not reasonably provide enablement for the flat base of the light emitting element being in physical contact with the substrate. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Regarding to independent claim 25, the Applicant discloses in the Specification and the Drawing that the light emitting element is connected to the substrate via a thermal

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conductor nowhere does the Applicant disclose the light emitting element is in physical contact with the substrate.

Regarding to claims 2-5, 13, 17 and 37, these claims are rejected because of the dependency upon the rejected independent claim 25.

Regarding to independent claim 30, the Applicant discloses in the Specification and the Drawing that the light emitting element is connected to the substrate via a thermal conductor nowhere does the Applicant disclose the light emitting element is in physical contact with the substrate.

Regarding to claims 31-36, these claims are rejected because of the dependency upon the rejected independent claim 30.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 16, are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,857,767 to Hochstein in view of U.S. Patent No. 6,582,100 to Hochstein.

Regarding to claim 1, Hochstein '767 discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) providing an electrically insulating coating (16) less than one thousand microns thickness (see column 4, lines 21-32); a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals and conductive paths for placing light emitting elements (20) in the circuit, the terminal (18) being of a metal compatible with metal droplet connections (26); a plurality of light emitting elements (20) having leads (22) bonded to the terminals (18) with metal droplets (26).

However, Hochstein '767 does not disclose a thermal conductor, having therein a metal, fixed relative to the substrate, spaced from and electrically isolated from the circuit traces, the entire flat section of the base of at least some of the light emitting elements being in physical contact with the thermal conductor and thereby in conductive heat transmitting relation with the thermal conductor.

Hochstein '100 teaches in Figures 2, 4 and 6, a light emitting assembly comprising: a thermal conductor (54), having therein a metal, fixed relative to the substrate (10), spaced from and electrically isolated from the circuit traces, the entire flat section of the base of at least some of the light emitting elements (20) being in physical contact with the thermal conductor (54) and thereby in conductive heat transmitting relation with the thermal conductor to make the light emitting elements release heat at a greater efficiency (see column 5, line 66 to column 6, line 4). Song also teaches in Figures 4 and 7, where metal paste or lump (18a-18e) fills the bottom hole of the light

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emitting device (23) for the purpose of achieving superior heat sink properties compared to the light emitting elements which have holes for heat sink only.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the thermal conductor of Hochstein '100 for the void space below the light emitting elements of Hochstein '767 in order to achieve superior heat sink properties compared to the light emitting elements which have holes for heat sink only.

Regarding to claim 16, Hochstein discloses in Figures 1-4, the metal droplet (26) is a wire-bonded connection (electrical conductive adhesive 26 bonded the electrical leads 22 to the circuit traces, and thus the Examiner interprets metal droplet 26 is a wire-bonded connection).

7. Claims 2-3, 5, 12, 13, 17, 25, 30-34, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,857,767 to Hochstein in view of U.S. Patent No. 6,999,318 to Newby.

Regarding to claim 25, Hochstein discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) having a surface providing an electrically insulating coating (16) less than one thousand microns thickness; a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals (18) and conductive paths (18) between the terminals for placing light emitting elements (20)

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in circuit, the circuit traces (18) comprising a quantity of silver effective to make the paths conductive, to make the terminals compatible with wire bonded (26) connections and to reflect a significant amount of light away from the substrate; and at least one light emitting element (20) having leads (22) bonded to the terminals (18) wire-bonded connections (26) and having a flat thermally conductive base.

However, Hochstein does not disclose having a flat thermally conductive base, electrically isolated from the circuit traces, the flat base being in physical contact with the substrate and thereby being in conductive heat transmitting relation with the substrate.

Newby discloses in Figures 2B, 3 and 5, it is old and well known in the art a light emitting assembly comprising: a flat thermally conductive base (22), electrically isolated from the circuit traces, the flat base (22) being in physical contact with the substrate (30' or 46) and thereby being in conductive heat transmitting relation with the substrate (30' or 46) for the purpose of achieving superior heat sink properties while improving cost and method of manufacturing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the thermal conductor of Newby for the light emitting elements of Hochstein in order to achieve superior heat sink properties while improving cost and method of manufacturing.

Regarding to claim 2, Hochstein discloses in Figures 1-4, the metal substrate (12) is selected from the group consisting essentially of aluminum, aluminum alloys,

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magnesium, and magnesium alloys (see column 4, lines 15-20) and the electrically insulating coating is an anodized layer (see column 4, lines 56-58).

Regarding to claim 3, Hochstein discloses in Figure 1-4, the electrically insulating coating is a cured thick film coating (see column 4, lines 53-56).

Regarding to claim 5, Applicant claims the electrically insulating coating is a plasma applied coating, please note that the claimed method steps are product by process limitations. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of product. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore, it is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an obvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113).

Regarding to claim 12, Hochstein discloses in Figures 1-4, the circuit traces (18) are thin film traces (see column 6, lines 5-25).

Regarding to claim 13, Hochstein discloses in Figures 1-4, the circuit traces (18) are thick film traces.

Regarding to claim 17, Hochstein discloses in Figures 1-4, a resistor in thermal contact with the substrate (12) in circuit with the light-emitting element (20) (see column 7, lines 21-24).

Regarding to claim 30, Hochstein discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) providing an electrically insulating coating (16) less than one thousand microns thickness; a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals (18) and conductive paths (18) for placing light emitting elements (20) in circuit, the terminals being of a composition compatible with metal droplet connections; and a plurality of light emitting elements (20) having leads bonded to the terminals with metal droplets.

However, Hochstein does not disclose having a light emitting elements having thermally conductive base, electrically isolated from the circuit traces, providing a flat section of predetermined area, the flat section being in physical contact with the substrate and thereby being in conductive heat transmitting relation with the substrate.

Newby discloses in Figures 2B, 3 and 5, it is old and well know in the art a light emitting assembly comprising: a flat thermally conductive base (22), electrically isolated from the circuit traces, the flat base (22) being in physical contact with the substrate (30' or 46) and thereby being in conductive heat transmitting relation with the substrate (30'

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or 46) for the purpose of achieving superior heat sink properties while improving cost and method of manufacturing.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the thermal conductor of Newby for the light emitting elements of Hochstein in order to achieve superior heat sink properties while improving cost and method of manufacturing.

Regarding to claim 31, Newby teaches in Figures 3A and 3B, a thermal conductor (48) fixed to the substrate (46), the flat section being in conductive heat transmitting relation with the thermal conductor (48), the thermal conductor (48) being in conductive heat transmitting relation between the base of the light emitting element and the substrate (46), and the combination to combine is the same as in claim 30.

Regarding to claim 32, Newby teaches in Figures 3A and 3B, the flat section of the light emitting element (22) is in conductive heat transmitting relation with the electrically insulating coating, and the motivation to combine is the same as in claim 30.

Regarding to claim 33, Newby teaches in Figure 2B, the insulating coating (26) has a hole immediately under the flat section of the light emitting element (24) is physical contact with the substrate (33) and thereby in conductive heat transmitting relation to the substrate through the hole, and the motivation to combine is the same as in claim 30.

Regarding to claim 34, Hochstein discloses in Figures 1-4, the circuit traces (18) comprise silver and glass (see column 5, lines 1-6).

Regarding to claim 36, Hochstein discloses in Figures 1-4, the metal droplet (26) is a wire-bonded connection (electrical conductive adhesive 26 bonded the electrical leads 22 to the circuit traces, and thus the Examiner interprets metal droplet 26 is a wire-bonded connection).

Regarding to claim 37, Newby teaches in Figure 2B, the base is of a predetermined area and all of the predetermined area is in physical contact with the substrate (33).

8. Claims 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,857,767 to Hochstein in view of U.S. Patent No. 6,999,318 to Newby and in further view of U.S. Patent No. 3,598,985 to Harnden Jr.

Regarding to claim 4, Hochstein discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) providing an electrically insulating coating (16) less than one thousand microns thickness (see column 4, lines 21-32); a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals and conductive paths for placing light emitting elements (20) in the circuit, the terminal (18) being of a metal compatible with metal droplet connections (26); a plurality

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of light emitting elements (20) having leads (22) bonded to the terminals (18) with metal droplets (26).

However, Hochstein does not disclose a metal coating on the substrate in heat transmitting relation between at least some of the light emitting elements and the substrate transmitting heat from the light emitting elements to the metal substrate and electrically insulating coating is a porcelain enamel.

Newby discloses in Figures 2B, 3 and 5, it is old and well know in the art a light emitting assembly comprising: a flat thermally conductive base (22), electrically isolated from the circuit traces, the flat base (22) being in physical contact with the substrate (30' or 46) and thereby being in conductive heat transmitting relation with the substrate (30' or 46) for the purpose of achieving superior heat sink properties while improving cost and method of manufacturing.

Harnden Jr. teaches a metal substrate (23) is coated with the insulating material (24) comprises of porcelain enamel or glass, or some other suitable vitreous material (see column 3, lines 25-29) for the purpose of provide an efficient insulate and isolate path between different electrical components.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the electrically insulating coating of Harnden Jr. and the protruding substrate of Newby for the void space below the light emitting elements of Hochstein in order to achieve superior heat sink properties compared to the light emitting elements which have holes for heat sink only and provide an efficient insulate and isolate path between different electrical components.

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9. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,857,767 to Hochstein in view of U.S. Patent No. 6,582,100 to Hochstein and in further view of U.S. Patent No. 5,098,864 to Mahulikar.

Regarding to claim 6, Hochstein '767 discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) providing an electrically insulating coating (16) less than one thousand microns thickness (see column 4, lines 21-32); a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals and conductive paths for placing light emitting elements (20) in the circuit, the terminal (18) being of a metal compatible with metal droplet connections (26); a plurality of light emitting elements (20) having leads (22) bonded to the terminals (18) with metal droplets (26).

However, Hochstein '767 does not disclose a thermal conductor on the substrate in heat transmitting relation between at least some of the light emitting elements and the substrate transmitting heat from the light emitting elements to the metal substrate and the metal coating provides a shiny metal patch reflecting light from the light emitting element away from the substrate thereby increasing the reflectivity of the assembly and increasing the amount of light emitting from the assembly.

Hochstein '100 teaches in Figures 2, 4 and 6, a light emitting assembly comprising: a thermal conductor (54), having therein a metal, fixed relative to the substrate (10), spaced from and electrically isolated from the circuit traces, the entire flat section of the base of at least some of the light emitting elements (20) being in physical contact with the thermal conductor (54) and thereby in conductive heat transmitting

relation with the thermal conductor to make the light emitting elements release heat at a greater efficiency (see column 5, line 66 to column 6, line 4). Song also teaches in Figures 4 and 7, where metal paste or lump (18a-18e) fills the bottom hole of the light emitting device (23) for the purpose of achieving superior heat sink properties compared to the light emitting elements which have holes for heat sink only.

Mahulikar teaches in Figure 2, a metal coating (46) provides a shiny metal (silver) patch reflecting light from the light-emitting element (32) away from the substrate (12) for the purpose of increasing the reflectivity of the assembly and increasing the amount of light emitting from the assembly.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize shiny metal patch of Mahulikar for the electrically insulating coating of Hochstein '100 for the void space below the light emitting elements of Hochstein '767 in order to achieve superior heat sink properties compared to the light emitting elements which have holes for heat sink only and increasing the reflectivity of the assembly and increasing the amount of light emitting from the assembly.

Regarding to claim 15, Mahulikar teaches that it is old and well known in the art to utilize a solder connection for connecting electrical components. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the solder connection of Mahulikar for the light assembly in order to securely and reliably connect the electrical components.

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10. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,857,767 to Hochstein in view of U.S. Patent No. 6,999,318 to Newby and in further view of U.S. Patent No. 5,098,864 to Mahulikar.

Regarding to claim 35, Hochstein discloses in Figures 1-4, a light emitting assembly (10), comprising: a metal substrate (12) providing an electrically insulating coating (16) less than one thousand microns thickness; a plurality of circuit traces (18) on the electrically insulating coating (16) providing terminals (18) and conductive paths (18) for placing light emitting elements (20) in circuit, the terminals being of a composition compatible with metal droplet connections; and a plurality of light emitting elements (20) having leads bonded to the terminals with metal droplets.

However, Hochstein does not disclose having a light emitting elements having thermally conductive base, electrically isolated from the circuit traces, providing a flat section of predetermined area, the flat section being in physical contact with the substrate and thereby being in conductive heat transmitting relation with the substrate and the metal droplet connection is solder.

Newby discloses in Figures 2B, 3 and 5, it is old and well know in the art a light emitting assembly comprising: a flat thermally conductive base (22), electrically isolated from the circuit traces, the flat base (22) being in physical contact with the substrate (30' or 46) and thereby being in conductive heat transmitting relation with the substrate (30' or 46) for the purpose of achieving superior heat sink properties while improving cost and method of manufacturing.

Mahulikar teaches that it is old and well known in the art to utilize a solder connection for connecting electrical components. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the solder connection of Mahulikar for the light assembly in order to securely and reliably connect the electrical components.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the thermal conductor of Newby and the metal droplet connection of Mahulikar for the light emitting elements of Hochstein in order to achieve superior heat sink properties while improving cost and method of manufacturing and secure an reliably connect the electrical components.

### ***Response to Arguments***

11. Applicant's arguments with respect to claims 1-6, 12, 13, 15-17, 25 and 30-37 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

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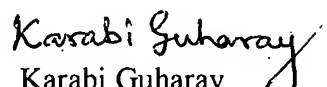
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



D.D.

April 24, 2006

  
Karabi Guharay  
Primary Examiner  
Art Unit 2879